FACT SHEET FOR NPDES PERMIT NO. WA0020834

TOWN OF CARBONADO

WASTEWATER TREATMENT PLANT

SUMMARY

This fact sheet explains the nature of the proposed discharge, the Department's decisions on limiting pollutants in the wastewater, and the regulatory and technical basis for those decisions. Public involvement opportunity is contained in Appendix A. Definitions are included in Appendix B. Calculations are shown in Appendix C.

The Town of Carbonado is located close to Mount Baker Snoqualmie National Forest and Mt. Rainier National Park. There are no other towns or discharges to the Carbon River that are upstream of the Town. The Town has approximately 500 residents connected to the treatment system. The system consists of a lagoon with aeration, settling, and chlorination. The discharge to the Carbon River is located in a steep, isolated canyon. The Puyallup River and other waters downstream of the Town have 303(d) listings for water quality problems. A Total Maximum Daily Load (TMDL) has been conducted for the Puyallup River Basin dealing with Ammonia and Dissolved Oxygen.

TABLE OF CONTENTS

Page

INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	Town of Carbonado
Facility Name and Address	Carbonado Wastewater Treatment Plant P.O. Box 91 Tubbs Road Carbonado, WA 98323
Type of Treatment:	Municipal Secondary Treatment- Aerated Lagoon, Chlorine Disinfection
Discharge Location	Carbon River at river mile 11.8 Latitude: 47º 04' 44" N Longitude: 123º 03' 31" W.
Water Body ID Number	WA-10-1050

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

The Town of Carbonado owns and operates the waste water facility which serves a population of approximately 500. The current facility began operation in 1969. The plant was upgraded in 1987 through 1989. The upgrade consisted of replacing the lagoon liner and improvement of the chlorine contact chamber and outfall. The plant was again modified in 1997 through 1999. Upgrades included the installation of a baffle dividing the lagoon in three zones; installation of two 15 HP aerators in two of the zones; a mechanical mixer installed in the chlorine contact chamber and revision of the treatment plant design criteria. The permit was modified on April 24, 1997 to remove mercury and copper from monitoring requirements based on size of the facility, lack of industrial discharges, and a large dilution for a small discharge.

COLLECTION SYSTEM STATUS

The collection system is a conventional gravity sewer system comprised of approximately 13,148 feet of pipe. There are no pump stations.

TREATMENT PROCESSES

The Town of Carbonado owns and operates the publicly owned treatment works (POTW). Flows from the collection system pass through a manually cleaned bar screen and flow by gravity to an aerated lagoon. The lagoon has baffles that split the basin into three cells. From the lagoon the effluent flows by gravity to a chlorine contact tank. The chlorine is distributed in gas form. There has been proposals to convert the chlorine disinfection system from gas to liquid distribution. See Appendix C for a schematic of the POTW.

There are no known industrial or commercial users of the system. The town at one time had an operational coal mining operation, however, the mine has been closed for many years and was never included as part of the treatment system.

The plant is Class I based on plant type and flow. The plant currently has two Class I certified operators.

DISCHARGE OUTFALL

The POTW discharges to a steep bank above the Carbon River. The drop from the POTW to the river is approximately 400 feet. The Carbon River in the vicinity of the outfall is a steep canyon with swift flowing water and large boulders. The seven day low flow that occurs once every ten years (7Q10) is 105.84 cfs (Ecology, 1993). The 7Q10 high flow is 944 cfs (USGS, 1983). The river drains a portion of Mt. Rainier and frequently has high flows and outwashes of sediment and gravel. The outfall pipe drops approximately 250 feet down the river bank before terminating at a deflector that causes the effluent to spray out over the canyon. This section of the river is not frequented by recreationalists. The effluent from the POTW has been viewed emerging at the bottom of the river bank and entering the river. Because of the steep banks, the fluctuating flow of the river, and large boulders, the river is very inaccessible. It would not be practical to install an outfall in the river with a diffuser because of the frequent outwashes that could rip out a traditional outfall.

RESIDUAL SOLIDS

Screenings of influent are taken to the landfill for disposal. Sludge is retained in the lagoon. The facility does not have a residual solids management program for periodic measurement and disposal of sludge from the lagoon cells. The lagoon has not likely been dredged to remove sludge buildup since a new liner was installed in the mid 1980s. A requirement to examine the sludge depth in the lagoon and BOD violations is included in the draft permit.

PERMIT STATUS

The previous permit for this facility was issued on June 30, 1994. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, Total Ammonia, Total Residual Chlorine and Copper.

An application for permit renewal was submitted to the Department on February 19, 1999 and accepted by the Department on November 14, 2000.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

A field visit to the site was conducted on September 5, 2000. The facility appeared to be operating normally at that time. The facility received its last full inspection on August 4, 1998. The facility was in the midst of being upgraded at that time and was struggling to meet performance limits with its old configuration.

During the history of the previous permit, the Permittee has **not** remained in compliance, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department. In the last two years (July 1998 – June 2000) the facility has been out of compliance for the following limited parameters:

Parameter	Limit	Times out of compliance	Comments
BOD (Average Monthly Limit)	30 mg/L	15	(mostly between August 1998 and October 1999)
BOD (Average Weekly Limit)	45 mg/L	7	
Percent Removal of BOD	Below 85%	2	(June 99 and Oct 99)
TSS (Average Monthly Limit)	65 mg/L	4	
Fecal Coliform (Weekly Limit)	400/100 ml	5	(Mostly between June 99 – October 99 and July – September 98)
Chlorine Residual (Monthly Limit)	0.3 mg/L	5	

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the discharge monitoring reports. The effluent is characterized as follows:

Table 1: Wastewater Characterization (for two year period July 1998—June 2000)

Parameter (Monthly Influent Loads)		Average
Flow avg. (mgd)		0.024
Flow max (mgd)		0.072
BOD avg. (lb/d estimate)		64 lb/d
BOD avg. (mg/L)		322
Parameter	(Effluent 95th percentiles)	Average
BOD monthly (mg/L)	51	32
BOD monthly (lb/d)	13.5	7.2
BOD weekly (lb/d)	15	8.8
BOD weekly (mg/L)	64	40
BOD removal percentage	--	89%
TSS monthly (lb/d)	15	9
TSS monthly (mg/L)	74	44
TSS weekly (lb/d)	18	11
TSS weekly (mg/L)	86	54
pH monthly low	6.23	6.9
pH monthly high	7.76	7.5
Fecal Coliform (monthly geomean, col/100mL)	65	16.4
Fecal Coliform (weekly geomean, col/100mL)	1395	293
Chlorine total residual weekly (mg/L)	0.34	.26
Chlorine total residual monthly (mg/L)	0.64	.43
Temperature maximums (°C)	22.5	14.8
Ammonia-N maximums (mg/L)	27.7	15.2

Copper and Mercury were monitored from the beginning of the permit until January 1997. The mercury was never present above the detection level of 0.5 ug/L. The copper averaged 21.2 ug/L over ten sampling periods. Because of the low levels of metals found in the effluent, the sampling was discontinued. Sampling using "clean techniques" was conducted by the Department of Ecology in association with the Puyallup TMDL. Results of the sampling are described in this fact sheet.

SEPA COMPLIANCE

There is no construction or changes to the system that will require a SEPA determination.

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the

application as present in the effluent**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation**.** Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The lagoon was modified in 1997 – 1999 with the installation of baffles, which reduced the overall capacity of the treatment system. Ecology's engineers downgraded the design capacity of the treatment system for plant flow from 0.10 mgd to 0.065 mgd.

The rest of the design criteria for this treatment facility are taken from a Parametrix, Inc. engineering report submitted to the Department of Ecology on April 11, 1996 and stated in an Ecology letter on July 30, 1996 to the Town of Carbonado. The design criteria are as follows:

Table 2: Design Standards for The Town of Carbonado WWTP.

Parameter	Design Quantity
Monthly average flow (max. month)	0.065 MGD
BOD_5 average concentration (max. month)	230 mg/L
BOD_5 influent loading (max. month)	125 lb./day
BOD removal efficiency	85%
Design population equivalent	720

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD_5, and TSS are taken from Chapter 173-221 WAC are:

Table 3a: Technology-based Limits.

Parameter	Limit
pH:	Shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 ml Weekly Geometric Mean = 400 organisms/100 ml

Parameter	Limit
BOD_5 (concentration)	Average Monthly Limit is the most stringent of the following: - Monthly concentration: 30 mg/L - Monthly mass loading limit: 17 lb./day - May not exceed fifteen percent (15%) of the average influent concentration
	Average Weekly Limit = 45 mg/L
	Weekly mass loading limit = 26 lb./day
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - Monthly concentration: 65 mg/L - Monthly mass loading limit: 35 lb./day - May not exceed fifteen percent (15%) of the average influent concentration
	Average Weekly Limit = 86 mg/L
	Weekly mass loading limit = 53 lb./day
Chlorine residual	Average Monthly Limit = 0.3 mg/L Average Weekly Limit = 0.7 mg/L

BOD-- The 1994 permit and fact sheet analysis of effluent showed that the Carbonado WWTP was able to meet the BOD limits imposed in the 1994 permit. Very little change in loading has occurred since that permit was written. Changes to the plant have occurred that necessitated the reduction of design flow. The BOD and TSS summary tables in the Appendix C show that the plant has in the past been operated in a manner that would meet the new lower limits. Because the plant was able to meet these limits in the past (anti-backsliding) and because there has not been a significant change in loading, the new limits will be used.

However, the plant has had difficulty meeting BOD limits over the last two years (July 1998-June 2000). It is unclear if the failure to meet limits is because the modification to the POTW using baffles did not improve the system, or if there is a build up of sludge in the lagoon, causing the system to short circuit. The examination of problems with the system will be a requirement of the new permit.

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (0.065 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 17 lb./day.

The Weekly limit is 45 mg/l when secondary treatment is used and the 45 mg/l is consistently met. The Carbonado system was able to meet the 45 mg/L consistently as demonstrated in the 1994 permit fact sheet. The weekly average effluent mass loading is calculated as 1.5 x 17 lb./day (monthly loading) = 26 lbs/day.

The 26 lbs/day is lower than the 38 lbs/day recommended as a Waste Load Allocation (WLA) by the 1993 TMDL for the Puyallup River (Ecology, 1993).

TSS-- In the last permit TSS was given a limit of 65 mg/L. Under Federal and State rules a lagoon system is allowed a monthly limit of up to 75 mg/L when 30 mg/L is not consistently met with secondary treatment. The 1994 permit fact sheet demonstrated that the facility could achieve 65 mg/L. During the period examined for this permit (July '98-June '00), the facility was able to achieve 73 mg/L-95 percent of the time. However, because the facility was previously able to achieve 65 mg/L, the 65 mg/L limit will remain.

The monthly TSS mass loading is calculated as: 0.065 mgd x 65 mg/L x 8.34 = 35 lb./day.

The weekly limit in the 1994 permit was 95 mg/L. Under Federal and State rules a lagoon system is allowed a weekly limit of up to 112 mg/L when 45 mg/L is not consistently met with secondary treatment. The 1994 permit fact sheet demonstrated that the facility could achieve 95 mg/L TSS. The Carbonado facility has improved TSS reduction some since the last permit and was able to achieve 86 mg/L 95 percent of the time over the period examined (July '98-June '00). Therefore the new limit will be 86 mg/L.

The weekly TSS mass loading is calculated as: 1.5 x monthly mass limit (35 lb./day) = 53 lb/day

Chlorine Residual--The technology-based monthly average limitation for chlorine is derived from standard operating practices. The Water Pollution Control Federation's Chlorination of Wastewater (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/liter chlorine residual is maintained after fifteen minutes of contact time. See also Metcalf and Eddy, Wastewater Engineering, Treatment, Disposal and Reuse, Third Edition, 1991. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/liter chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/liter.

The existing permit has a chlorine average monthly limit of 0.3 mg/L and a weekly limit of 0.7 mg/L. The facility has been shown in the 1994 fact sheet to be able to comply with the limit. The proposed permit includes the same limit.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

ANTIDEGRADATION

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses. Critical conditions used in calculations and spreadsheets are shown in table 4 below.

MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100. Calculations used in determining a dilution factor are shown below.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

The Town of Carbonado discharges to The Carbon River which is designated as a Class AA receiving water in the vicinity of the outfall. There are no other known outfalls upstream of the Carbonado Plant. The nearest outfall is several miles downstream at the Orting POTW. Significant nearby non-point sources of pollutants have not been assessed, however, the nature of the land use above Carbonado is predominantly forest with occasional residential homes. There is very little livestock or farms above the town of Carbonado and no industry. There is very little developed land between the town of Carbonado and the border of the National Forest or Mount Rainier National Park.

Characteristic uses include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Table 4: Critical Conditions

Fecal Coliforms	100 organisms/100 ml maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. Due to the nature of this over-the-cliff discharge, a mixing zone cannot be modeled. The characteristics of the discharge when it reaches the river are difficult to assess. There is no known adverse environmental impact from this discharge.

A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

Maximum allowable length = 300 feet downstream, 100 feet upstream.

Maximum allowable width = 14.5 feet (25% of the river width).

Maximum allowable dilution factor = 398 (25% of 7Q10 critical flow)

The allowable dilution factor (DF) is calculated as follows:

The critical flow is described below prior to the critical condition table. For the Carbon River at River Mile 16.1 the 7Q10 flow was 105.84 cfs.

The Carbonado plant during the summer season (July – October, 1999 – 2000) had a maximum effluent flow of 0.043 mgd.

(0.043 mgd) x (1.547 cfs/mgd) = 0.0666 cfs

Chronic DF (using 25% of river flow) DF = (0.0666 +(105.84 x 0.25))/0.0666 = 398

The acute dilution factor is based on the 7Q10 flow x 2.5%.

DF = (0.0666 + (105.84 x 0.025))/0.0666 = 40.7.

	Acute	Chronic
Aquatic Life	40.7	398
Human Health, Carcinogen		398
Human Health, Non-carcinogen		398

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The critical condition for the Carbon River is the seven-day average low river flow with a recurrence interval of ten years (7Q10). Ambient data at critical conditions in the vicinity of the Carbonado outfall was taken from the TMDL study which considered both historical data and an intensive monitoring study conducted in September-October 1990. The ambient background data used for this permit includes the following from the Puyallup River Basin TMDL (Ecology, 1993) and the Puyallup Basin Treatment Plant metals survey (Ecology, 1997):

Parameter	Value used
7Q10 low flow	105.84 cfs
Width	58.0 feet
Temperature	15.3^{o} C
pH (high)	8.4
Dissolved Oxygen	9.8 mg/L
Total Ammonia-N	24.47 mg/L acute, 1.92 chronic

Fecal Coliform	48/100 ml
Conductivity	28.8
Turbidity	150 NTU
Hardness	32.4 mg/L as CaCO3 ambient, 46.2 effluent
Mercury	0.0 ambient (below detection level), 0 effluent
Copper	0.0 ug/L ambient (below detection level), 18.4 effluent
Lead	0.0 ug/L ambient, 0 effluent (all samples were contaminated)
Zinc	6.7 ambient, 51.8 effluent
All Other Metals	0.0 (Below detection limits)

BOD_5--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature--The impact of the discharge on the temperature of the receiving water was modeled by simple mixing analysis at critical condition. The receiving water temperature at the critical condition was 15.3 ^oC and the effluent temperature was 22.48 ^oC. The predicted resultant temperature at the boundary of the chronic mixing zone was 15.3045^oC and the incremental rise predicted was 0.0043 ^oC.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH--The impact of pH was modeled using the calculations from EPA, 1988. The input variables were dilution factor 398:1, upstream temperature 15.3^oC, upstream pH 6.7 (low), upstream alkalinity 12(as mg $CaCO_3$/L), effluent temperature 22.48^oC, effluent pH of 5.1, effluent pH of 7.79, and effluent alkalinity 112 (as mg $CaCO_3$/L).

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitations for pH was placed in the permit and temperature was not limited.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 398:1.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined in the previous permit to be present in the discharge: chlorine, ammonia, copper, mercury, lead and zinc. A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit. No reasonable potential to exceed toxic levels was found using the new data.

The determination of the reasonable potential for the above mentioned parameters to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The parameters used in the critical condition modeling are as follows: acute dilution factor 40.7, chronic dilution factor 398, receiving water temperature 15.3^{o}C, receiving water alkalinity 12(as mg $CaCO_3$/L), and receiving water hardness of 32.4 (as mg $CaCO_3$/L). Receiving water concentration of chemicals and metals may be found in the reasonable potential table in Appendix C.

The 1994 permit fact sheet used receiving water data from the 1993 Puyallup River TMDL. The 1994 fact sheet demonstrated that the only metals that had a reasonable potential to violate standards were copper and mercury. This fact sheet (2001) used the same background data as the 1994 fact sheet in addition to effluent and background data that was collected for the Puyallup Basin Treatment Plant Metals Survey (Ecology, 1997). Changes have been made to the hardness, dilution factors, ambient metals, and effluent values.

The reasonable potential analysis in the 1994 fact sheet determined that there was a potential for copper and mercury to violate water quality standards. However, on January 27, 1997 the Department of Ecology issued a modification to the Carbonado permit that removed the permit limits for copper and mercury. The basis for this decision was that, after monitoring with clean sampling techniques, mercury was not detected at the method detection limit. Therefore there was no reasonable potential to exceed the water quality standard for mercury.

The reasonable potential analysis for this 2001 permit (Appendix C) using the most recent data, confirmed that mercury and copper did not show a reasonable potential to violate water quality criteria.

Metals and hardness were reevaluated in 1996 (Ecology, 1997). A hardness value was determined using the 1997 data that was significantly higher than originally estimated in the Puyallup TMDL (Ecology, 1993). Hardness values from the Carbon River near Carbonado were compared with Carbon River at Orting where hardness was sampled more frequently. Orting is approximately 15 miles downstream from Carbonado. The hardness values at Orting were always higher by at least a factor of two from the values used in the 1993 TMDL. Therefore, a 90th percentile hardness value was calculated using values from both the 1997 data and the 1993 data for the Carbon River at Carbonado. The 90th percentile hardness value was 32.4 mg/L which was then used to determine hardness dependent metals criteria.

The 1997 permit modification also found that ambient concentrations of copper were at the water quality standard. However, the reasonable potential analysis for this 2001 permit shows that copper does not pose a reasonable potential to violate standards. Ambient copper concentrations (Ecology, 1997) were below detection in three out of four samples. The fourth sample showed dissolved copper greater than total copper and total copper was at or below detection, placing this sample in suspicion. Therefore a value of 0.0 was used for ambient conditions. Copper effluent data gathered in 1996 (Ecology, 1997) had a maximum value of 18.4 ug/L.

In the most recent analysis, lead was not shown to have a reasonable potential to violate standards. Lead samples taken in the 1993 TMDL showed contamination problems in every sample. Lead samples were assumed to be below the detection level. There is no reason to suspect that lead will be a problem in the future. No limit for lead will be placed in the permit.

No valid ambient background data was available for other metals. A determination of reasonable potential using zero for background resulted in no reasonable potential. Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.

Toxicity caused by unidentified pollutants is not expected in the effluent from this discharge as determined by the screening criteria given in Chapter 173-205 WAC. Therefore, no whole effluent toxicity testing is required in this permit. The Department may require effluent toxicity testing in the future if it receives information that toxicity may be present in this effluent.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge is unlikely to contain chemicals regulated for human health, and does not contain chemicals of concern based on existing data. The discharge will be re-evaluated for impacts to human health at the next permit reissuance.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Because of high BOD and TSS in the effluent, as compared to the last permit cycle, investigation of the likely cause will need to be made. An over accumulation of sludge in the lagoon is a likely source.

Monitoring for sludge depth in the lagoon is being required to further characterize treatment efficiency and evaluate the effectiveness of the treatment system. A report on the depth of the sludge must be submitted to the Department of Ecology. If the sludge depth is effecting the efficiency of the treatment system, the permittee will be required to dredge before the end of the permit cycle or replace the lagoon at some future date. The permittee may be required to measure sludge depth annually and dredge the lagoon once every five years.

Monitoring of sludge quantity and quality is also necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for General Chemistry: BOD_5, DO, TSS, pH, fecal coliform, and total residual chlorine.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3. are based on the authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4. restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains condition S.5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in permit condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503. The disposal of other solid waste is under the jurisdiction of the Pierce County Health Department.

Requirements for monitoring sewage sludge and record keeping are included in this permit. This information will by used by Ecology to develop or update local limits and is also required under 40 CFR 503.

PRETREATMENT

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference The definitions of pass through and interference are in Appendix B of the fact sheet..

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for five years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

1996. Hoyle-Dodson, Guy. Puyallup Basin Treatment Plant Metals Survey. Publication Number 97-303.

1994. Permit Writer's Manual. Publication Number 92-109

1993. Pelletier, Greg J. Puyallup River Total Maximum Daily Load for Biochemical Oxygen Demand, Ammonia, and Residual Chlorine. Publication Number 96-326

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to issue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations, which are described in the rest of this fact sheet.

Public notice of application was published on date and date in name of publication to inform the public that an application had been submitted and to invite comment on the reissuance (or issuance)of this permit.

The Department will publish a Public Notice of Draft (PNOD) on date, in name of publication to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator
Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775.

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 360/407-6554 , or by writing to the address listed above.

This permit and fact sheet were written by Eric Schlorff**.**

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at http.www:wa.gov.ecology.

Freshwater un-ionized ammonia criteria based on EPA Gold Book	
(EPA 440/5-86-001) as revised by Heber and Ballentine (1992).	
Based on Lotus File NH3FRES2.WK1 Revised 12-Dec-94	
INPUT	
1. Temperature (deg C; 0<T<30):	11.2
2. pH (6.5<pH<9.0):	7.70
3. Total Ammonia (ug N/L):	22.0
4. Acute TCAP (Salmonids present- 20; absent- 25):	20
5. Chronic TCAP (Salmonids present- 15; absent- 20):	15
OUTPUT	
1. Intermediate Calculations:	
Acute FT:	1.8365
Chronic FT:	1.8365
FPH:	1.2009
RATIO:	13.5000
pKa:	9.6891
Fraction Of Total Ammonia Present As Un-ionized:	1.0151%
2. Sample Un-ionized Ammonia Concentration (ug/L as NH3-N):	0.2
3. Un-ionized Ammonia Criteria:	
Acute (1-hour) Un-ionized Ammonia Criterion (ug/L as NH3-N):	96.9
Chronic (4-day) Un-ionized Ammonia Criterion (ug/L as NH3-N):	22.1
4. Total Ammonia Criteria:	
Acute Total Ammonia Criterion (ug/L as NH3-N):	9,546
Chronic Total Ammonia Criterion (ug/L as NH3-N):	2,176

Reasonable Potential Determination

	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	State Water Quality Standard		Max concentration at edge of...		**LIMIT REQ'D?**
Parameter	Acute	Chronic	*Ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*	
Chlorine				19.00	11.00	9.34	0.96	NO
Ammonia			22.00	9546.00	2176.00	1196.91	142.15	NO
Copper	0.996	0.996	0 (U)	5.88	4.33	1.34	0.14	NO
Mercury	0.85	0.85	0 (U)	2.10	0.012	0.00	0.00	NO
Lead	.47	.47	0	18.55	0.72	0.0	0.0	NO
Zinc	0.996	0.996	6.52	44	40.18	11.14	7.00	NO

CALCULA -TIONS

Effluent percentile value		Max effluent conc. Measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
	Pn	*Ug/L*	*CV*	*S*	*n*			
0.95	0.996	660.00	0.60	0.55	720	0.58	41	398
0.95	0.939	45400.00	0.60	0.55	48	1.05	41	398
0.95	0.607	18.40	0.60	0.55	3	2.14	41	398
0.95	0.607	0.06	0.60	0.55	6	2.14	41	398
0.95	0.224	0.0 (B)	0.60	0.55	2	3.79	41	398
0.95	0.224	51.80	0.60	0.55	2	3.79	41	398

COMMENTS: Mercury values were below detection with clean sampling techniques.
U = below detection. B=Lead samples possibly contaminated. Ambient copper values were mostly below detection. One of the four copper values was above detection but the dissolved value was greater than the total value, therefore a value of zero was used for the ambient concentration.

Metals From 1993 Puyallup TMDL

Ambient (Car 17.7)					
Date	Tot Cu	Dis Cu	Dis Hg	Dis Pb	Dis Zn
9/18/90	2u	2.1J	0.02U	0.77JB	5.5JB
9/19/90	2.7J	1U	0.02U	3.41B	3.8JB
10/2/90	4.9J	2U	0.02U	0.85JB	6.7J
10/3/90	35.9	2U	0.02U	0.81JB	2.0U
95th%tile		**0**	**0**	**0.846**	**6.52**
Plant effluent					
Date	tot Cu	tot hg	tot Pb	Tot Zn	Hardness
9/18/90	6.4J	0.12J	3.11B	36.8	
10/2/90	13.2	0.08J	3.06B	51.8	46.2
Max	**13.2**	**0.12**	**3.11**	**51.8**	**46.2**

U = not detected at or above reported value. B = samples possibly contaminated. J = estimated value

Metals From 1997 Puyallup Basin Treatment Plant Metals Survey

Effluent			
Date	Cu	Hg	Hardness
8/29/95	18.4	0.05U	47.9
11/28/95	16.3	0.05U	40.6
3/26/96	13.4	0.062	25
Max	**18.4**	**0.062**	**47.9**
Ambient			
Date	Hardness	Hardness at Orting	
11/28/95	45.4	64.8	
3/26/96	12.8	31.5	
8/29/95		26.4	
5/28/96		21.3	
95th%tile	**43.8**	**59.805**	

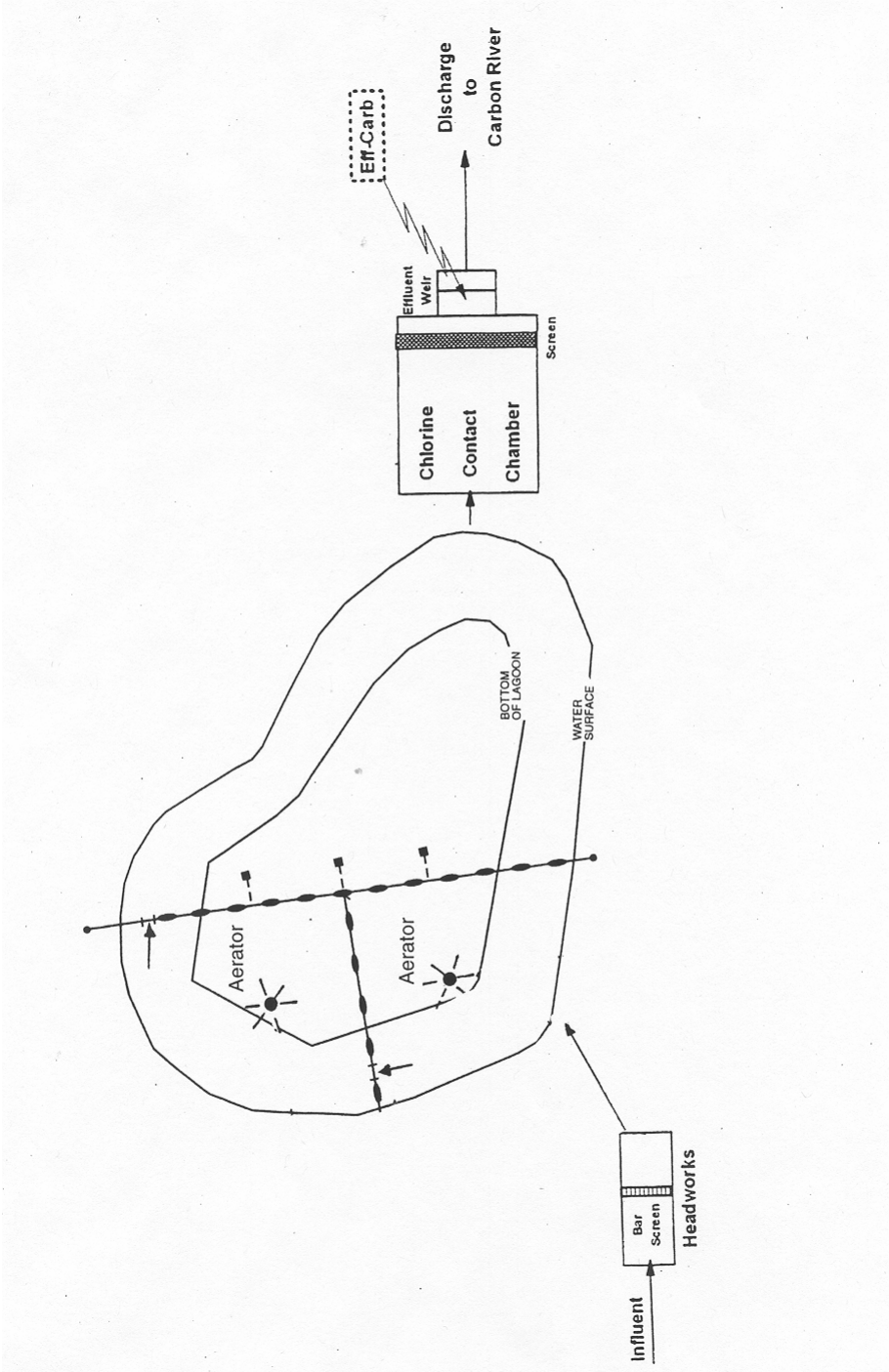
Treatment Plant Flow Data for
July 1998-June 2000

mo/yr	ave flow	Max flow
	mgd	Mgd
Jun-00	0.0181	0.0274
May-00	0.0195	0.0249
Apr-00	0.0210	0.0430
Mar-00	0.0211	0.0294
Feb-00	0.0210	0.0394
Jan-00	0.0212	0.0270
Dec-99	0.0222	0.0391
Nov-99	0.0270	0.0642
Oct-99	0.0213	0.0428
Sep-99	0.0243	0.0310
Aug-99	0.0250	0.0384
Jul-99	0.0242	0.0344
Jun-99	0.0250	0.0514
May-99	0.0245	0.0311
Apr-99	0.0224	0.0281
Mar-99	0.0244	0.0364
Feb-99	0.0260	0.0346
Jan-99	0.0279	0.0424
Dec-98	0.0331	0.0593
Nov-98	0.0307	0.0716
Oct-98	0.0305	0.0419
Sep-98	0.0248	0.0298
Aug-98	0.0223	0.0308
Jul-98	0.0233	0.0280
Permit limits	0.0650	0.0650
Average	0.0242	0.0386
Maximum		0.0716
95th %tile	0.0307	0.0635
Percent of limit		.063/.065= 98%
1994 Fact Sheet Data for Comparison		
1990-1993 max	.0380	.0518
1990-1993 95th %tile	.0353	.0483
1990-1993 Avg.	.0260	.0380

Treatment Plant BOD_5 and TSS Data for July 1998-June 2000
(Compared with 1994 fact sheet data at bottom)

	BOD					**TSS**			
	Monthly Averages			Weekly Average		Monthly Averages			Weekly Average
Date	Influent	Effluent	Percent					Percent	
mo/yr	BOD mg/L	BOD mg/L	Removal	BOD mg/L		TSS in mg	TSSam mg	Removal	TSSaw mg
Jun-00	399.0	**34.4**	91	44.0		316.0	44.0	86	52.0
May-00	345.0	26.2	92	29.0		328.0	21.2	94	26.0
Apr-00	290.0	**33.5**	88	38.0		236.0	35.7	85	46.0
Mar-00	332.0	24.4	93	28.0		367.0	26.2	93	30.0
Feb-00	299.0	16.5	94	24.0		300.0	24.0	92	28.0
Jan-00	350.0	22.7	94	26.0		371.0	28.0	92	36.0
Dec-99	306.0	21.8	93	27.0		273.0	35.0	87	41.0
Nov-99	258.7	19.0	93	21.0		203.5	43.3	79	50.0
Oct-99	282.0	**52.2**	81	**79.0**		237.0	**74.5**	69	94.0
Sep-99	274.5	**31.0**	89	35.0		264.0	62.0	77	68.0
Aug-99	291.0	**33.7**	88	42.0		290.7	**69.7**	76	86.0
Jul-99	262.0	**32.0**	88	40.0		265.0	52.7	80	74.0
Jun-99	314.7	**57.5**	82	**65.0**		316.0	**79.0**	75	86.0
May-99	281.2	**34.8**	88	**55.0**		249.2	27.9	89	36.0
Apr-99	320.0	**39.3**	88	43.0		240.0	61.0	75	77.0
Mar-99	359.0	**39.5**	89	43.0		281.5	**65.0**	77	76.0
Feb-99	288.0	**30.7**	89	43.0		217.0	44.2	80	60.0
Jan-99	315.7	25.2	92	29.0		273.0	29.2	89	30.0
Dec-98	367.6	23.4	94	28.0		289.6	31.6	89	43.0
Nov-98	569.0	**42.0**	93	**59.0**		636.0	58.3	91	62.0
Oct-98	309.0	**40.5**	87	**49.0**		280.0	43.7	84	47.0
Sep-98	317.7	**38.0**	88	**50.0**		302.0	58.2	81	76.0
Aug-98	366.0	**32.8**	91	**55.0**		407.0	24.5	94	32.0
Jul-98	232.0	23.4	90	30.0		186.0	28.0	85	36.0
Permit Limits		30.0		45			65.0		95.0
95th%tile	394.3	50.7	94	64		401.6	73.8	93	86.0
Average	322.0	32.3	90	41		297.0	44.4		53.8
Minimum	232.0		81			186.0	21.2	69	26.0
Maximum	569.0	57.5		79		636.0	79.0	94	94.0
1994 Fact Sheet Data Summary for Comparison									
1990-1993 95th%tile		25	90	36			57.5	66	72.8
1990-1993 min	107.5		86			43.8		46	
1990-1993 max	422.5	31		43		891.0	67.5		103.0

Schematic of the Carbonado POTW



APPENDIX D--RESPONSE TO COMMENTS

Puget Soundkeeper Alliance, letter dated November 29, 2001
Citizens for a Healthy Bay, letter dated December 18, 2001

Comment 1:

Puget Soundkeeper Alliance (PSA) and Citizens for a Healthy Bay (CHB) recommend that the Department of Ecology eliminate or decrease the size of the mixing zone in the draft permit. PSA and CHB do not support the use of mixing zones to meet water quality standards. "We believe that by decreasing the mixing zone that the goals of the Clean Water Act are being more closely followed than that over time the use of mixing zones will be discontinued and that all permit holders will be required to meet limits at the end of their outfall pipes and not the boundaries of their mixing zones. Secondly, a quick correction to where the mixing zone descriptions are being placed in the permit. In the table of contents, it lists the mixing zone descriptions, part B, in section S1 on page 5. While viewing the permit these mixing zone descriptions were found on page 6."

Response:

A mixing zone is allowed under current regulations (Chapter 173-201A WAC). There is no program to continually downsize mixing zones or to phase them out. Because of the nature of the discharge and the isolation of the discharge, the mixing zone size will remain unchanged.

Comment 2:

From PSA: We would like to reiterate that we do agree with the examination of problems with current system being employed by the Town of Carbonado as being a requirement of the new permit. We feel that this, if done soon and thoroughly, will help the Town of Carbonado to discover what is keeping them from complying with their permit despite the upgrades and modifications of their plant. We also would like to encourage the Department of Ecology to work closely with the Town of Carbonado to ensure that this examination is being done with urgency and thoroughness so that these problems are resolved as soon as possible.

Response:

Puget Soundkeeper Alliance's agreement with Ecology's action is acknowledged. Ecology will continue to work with Carbonado and other small communities to find solutions.

Comment 3:

From PSA: We believe that noncompliance with the prior permit was a major issue with the Town of Carbonado. As shown on the fact sheet, the plant had around 38 noncompliances between 1998 and 1999. While this seems directly correlated with the upgrades and modifications of the plant during this time, that we believe will ultimately help them make future permit requirements, the number of noncompliances is not acceptable. We hope in the future that the Town of Carbonado will do a better job making their permit requirements and will do a better job in foreseeing any problems that may occur while doing any future upgrades on their plant.

Response:

Ecology agrees that non-compliance with the previous permit is not an acceptable way to run a treatment plant. Ecology has written the new permit with future permit requirements in order to attain compliance.

Comment 4:

From CHB: Lagoon Sludge The draft permit requires that the lagoon be evaluated for sludge depth, and a report on the progress of dredging or pumping the solids in the lagoon if determined by the Department to be excessive by September 15 2002. In a report dated November 5, 2001, facility inspectors from the Department of Ecology determined that as of October 17, 2001, sludge depths in the 3rd cell of the aeration pond reached depths of up to 6 feet and that the lagoon outfall was unable to draw effluent water from the clear zone. The facility does not have a residual solids management program and there is no record of is being dredged since a new liner was installed in the mid 1980s. It is imperative that solids from the lagoon be pumped or dredged.

Response:

Ecology is working with Carbonado to resolve the sludge problem and will be rechecking on a regular basis to track progress.

Comment 4:

From CHB: Duckweed Management. The same report states that the 3rd cell of the aeration pond had a thick cover of duckweed, which was contributing to the accelerated accumulation of sludge in the lagoon. It was made clear in the report that the decomposition of the sludge is returning BOD and nutrients back into the water column and makes it more difficult for the treatment system to meet discharge limits. During the history of the previous permit, the Permittee has not remained in compliance, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department. It is imperative that the duckweed be removed and a plan for managing it is in place prior to re-issuing this permit.

Response:

Ecology is working with Carbonado to resolve the sludge problem and will be rechecking on a regular basis to track progress.